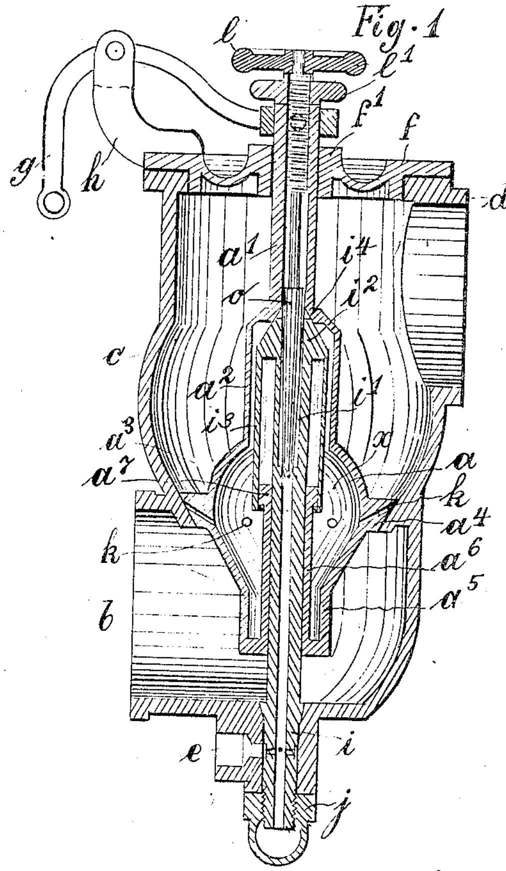
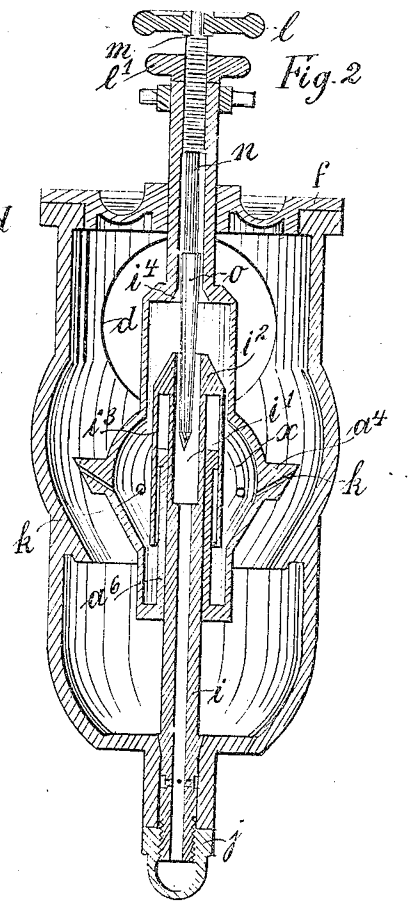
C. A. MARRDER.

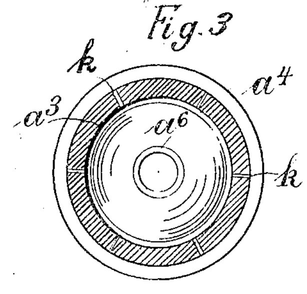
CARBURETER.

APPLICATION FILED MAY 4, 1909.

977,813. Patented Dec. 6, 1910.




Witnesses
Flora Greenwald.
Alfred Lyon

By his Attorney

Inventor
Charles A. Marrder
F. K. Böhm.

# UNITED STATES PATENT OFFICE.

IARLES A. MARRDER, OF NEW YORK, N. Y.

CARBURETER.

977,813. Specification of Letters Patent. Patented Dec. 6, 1910.

Application filed May 4, 1909. Serial No. 493,893.

*To all whom it may concern:*

Be it known that I, CHARLES A. MARRDER, a citizen of the United States of America, and a resident of the borough of Manhattan, New York city, county and State of New York, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention has reference to carbureters for use in hydrocarbon motors.

It is the special object of my invention to produce a carbureter with means for regulating the inlets for the air and liquid hydrocarbon in order to maintain a proper proportion of air and liquid. By increasing or reducing these inlets in proper proportion the motor may be run at a high, intermediate or low speed and may be stopped entirely when said inlets are closed. These main objects are primarily attained by means of a spray nozzle sliding on the fuel supply pipe and communicating therewith operated by a lever and a carbureting chamber extending below into a tapered air intake which is controlled by said nozzle. The carbureter chamber and air intake surround the nozzle and lead to the motor cylinder. By operating the lever in connection with the spray nozzle the supply of fresh air and liquid hydrocarbon are regulated as to quantity.

Special adjusting means are provided within the spray nozzle for regulating the supply of liquid hydrocarbon so that different quantities may be mixed with a certain quantity of air whereby combustible mixtures are produced containing variable proportions of hydrocarbon and air but when the supply of liquid has been regulated the proportion between same and the air remains constant until said adjusting means for regulating the supply of hydrocarbon are again operated. In this way different grades of combustible mixtures are produced containing more or less of the liquid hydrocarbon thus making the carbureter adapted for use with different kinds of hydrocarbons and incidentally different grades of power may be obtained.

By providing a liquid storage chamber in the spray nozzle liquid hydrocarbon is stored within the nozzle. Air is periodically drawn to the motor which sucks a corresponding predetermined proportion of liquid out of said storage chamber, carbureting the air in the tapered air intake and mixing chamber before the mixture goes to the cylinder. Various details of construction have also been improved with a view of reducing the cost of construction and it has been sought to produce a neat and desirable article all as will be fully described hereinafter in connection with the accompanying drawing in which:

Figure 1 represents in vertical section a carbureter for hydrocarbon motors embodying in desirable form the present improvements, showing the mechanism when the motor is at rest. Fig. 2 is a vertical central section of same at a right angle with Fig. 1 showing the mechanism when the motor is in operation, and Fig. 3 is a horizontal section through the spray nozzle showing the outlets for the liquid fuel.

Similar characters of reference denote like parts in all the figures.

The spray nozzle $a$ is arranged to regulate and close the tapering air intake opening $a^3$ of the carburizing chamber $c$ which has a motor supply tube $d$. Said nozzle is tapered complementary to the tapered air intake $a^3$. When the nozzle is in a raised position the suction of the motor acting through the air intake $a^3$ of the carburizing chamber $c$ will draw fresh air into the latter. The nozzle is provided with an annular storage chamber $x$ having an annular tapered portion $a^4$ through which a series of discharge orifices $k$ with outlets pass. These issue the liquid fuel into the carburizing chamber when the nozzle is raised. The upper portion of the spray nozzle extends through the cover $f$ of the carburizing chamber and connects with the operating lever or handle $g$ which is fulcrumed to a suitable support $h$ located on said cover.

The liquid hydrocarbon enters through a pipe or inlet $e$, see Fig. 1. A liquid supply pipe $i$ is permanently secured to the lower portion of the air inlet $b$ and preferably screwed into the bottom cap $j$. This pipe connects with the inlet $e$ for the liquid and supplies the liquid to the storage chamber $x$ of the nozzle $a$. The pipe $i$ extends vertically up higher than the storage chamber $x$. The upper portion of the pipe $i$ is bored out forming an elongated cylindrical chamber $i^1$ which is open at the top and extends into an enlarged conical portion $i^2$ from which a wider tubular portion $i^3$ extends downwardly. At the bottom portion $a^5$ of the storage chamber $x$ of the nozzle there is provided a tubular portion $a^6$ extending upwardly into the tubular portion $i^3$. The tube $a^6$ is slightly enlarged at the top at $a^7$ and the tube $i^3$ bent inwardly at the bottom. The liquid from the inlet $e$ passes up through the tube $i$ around the conical portion $i^2$ and down into the storage chamber $x$. The inner tube $a^6$ prevents the escape of liquid around the supply pipe $i$.

Above the storage chamber $x$ there is a nozzle portion $a^2$ forming a narrow tube $a^1$ which passes through the cover of the carbureter. At the point where the nozzle portion $a^2$ narrows into the tubular portion $a^1$ the inner opening of $a^1$ is flanged out and tapered as shown at $i^4$ which renders it adapted to receive the conical portion $i^2$ forming the top of the liquid supply pipe whereby the supply of liquid to the storage chamber may be shut off when it is desired to stop the motor and when the inlets for the air and liquid are closed.

The flow of the liquid from the tank to the storage chamber is by pressure when the tank is located below and by gravity if located above same insuring in this manner a continuous flow of fuel.

To regulate the flow of the liquid from the tank into the storage chamber $x$ of the nozzle and to mix the air and liquid in the proper proportion a needle valve $o$ is mounted within the opening of the tubular top portion $a^1$ of the nozzle. This valve extends beyond the nozzle portion $a^1$ and is provided with a handle $l$ and a threaded portion $m$ whereby it may be moved up and down in the threaded top end of the nozzle portion $a^1$. The lower portion of the valve $o$ is tapered, it extends into the chamber $i^1$ of the supply pipe $i$ and according to requirement is screwed up and down so that more or less oil may pass through the channel $i^1$ around the lower portion of the valve $o$ and the conical portion $i^2$ of the supply pipe into the storage chamber. Thus the needle valve throttles the liquid inlet and when the nozzle closes the air intake the bottom point of the needle valve closes off the supply tube as shown in Fig. 1. Thus the lower point of the needle valve forms a closure for the narrow portion of the supply pipe but the regulation of the flow of the liquid is effected by the location of the needle valve within the conical portion $i^2$ of the supply pipe. The nozzle and needle valve are combined and travel simultaneously the same distance on the fuel pipe.

Assuming that the motor is started with little power and the nozzle raised a little by means of the lever $g$ which is operated by hand then the air intake is open and the needle valve is raised a little in the channel $i^1$ of the liquid supply pipe $i$. The nozzle and needle valve being connected as above stated admit air and liquid fuel in the desired constant proportion no matter how little or how much the nozzle is raised. The higher the nozzle is raised the more oil will flow into the storage chamber and the more air will pass through the intake but always in the same proportion as long as the needle valve is in the adjusted position. Thus I produce explosive mixtures of constant proportions in every position of the nozzle containing various quantities of air and fuel. When the motor shall be stopped the nozzle and needle valve go down together and the nozzle closes the air intake at the same time the discharge orifices $k$ are closed, while the needle valve closes off the supply of liquid.

In order to render it possible to mix different quantities of liquid fuel with a certain quantity of air the above mentioned threaded portion $m$ and handle $l$ is provided at the top of the needle valve. Below the threaded portion there is a narrow circular portion $n$ on which the conical needle valve $o$ is formed and when the handle $l$ is turned so that the conical valve is raised more liquid fuel is supplied while the quantity of air has not been increased. Vice versa, when the handle $l$ is turned so that the conical valve $o$ descends less liquid fuel is supplied to the same quantity of air whereby different grades of combustible mixtures are produced or different grades of liquid fuel may be used. A lock nut $l^1$ secures the needle valve in the adjusted position. It is easily understood that the needle valve when screwed high up for allowing more liquid to pass will not reach down to close the liquid supply pipe $i$ when the nozzle is completely let down. In this instance the conical portion $i^2$ of the supply pipe will close off the supply of liquid fuel by lodging in the tapered seat $i^4$ above referred to then both the air intake and the liquid fuel supply are closed which will result in the stopping of the motor.

The operation of the carbureter is as follows: As above stated the liquid fuel is now allowed to flow from the supply tank into the storage chamber $x$ either by gravity or pressure. The lever $g$ then is operated by hand so that the nozzle rises into a position as for instance shown in Fig. 2. Two or three seconds are required to fill the storage chamber with the required quantity of liquid fuel necessary for the start. The motor is turned on and sucks air by means of the piston through the tapered air intake around the nozzle and the current of air strikes against the tapered nozzle and sucks the liquid out of the chamber which then mixes with the air before going to the cylinder. This mixture is compressed, ignited and exploded in the general way. When the motor is started any variations in speed may be made by operating the lever $g$ whereby increased or reduced power may be obtained without changing the proportions between air and liquid fuel.

The present motors for automobiles have a float which is purposed to close the inlet for the liquid when the chamber in the carbureter is filled. This plainly shows that not a predetermined quantity is always therein. Many times more liquid is drawn out without sucking in a sufficient quantity of air for a complete combustion which is plainly noticed from the insufferable odor of the exhaust. For that reason the use of a float has been entirely dispensed with. After the motor has been started there is a certain predetermined quantity of liquid fuel for every intake of the air resulting in an explosive mixture of constant proportions whereby a complete combustion in the motor is assured, fuel saved and the insufferable odor of the exhaust avoided.

I claim as my invention:—

1. A carbureter for producing explosive mixtures of constant proportions comprising a mixing chamber with air intake, a fuel supply pipe within same issuing the fuel through its open top, a movable nozzle forming an auxiliary storage chamber for the fuel, an adjustable fuel supply regulator within said nozzle, and means outside of the mixing chamber to move said nozzle and fuel supply regulator up and down on the fuel supply pipe whereby both the air and fuel supply may be regulated and stopped by the operator.

2. A carbureter for producing explosive mixtures of constant proportions comprising a mixing chamber with tapered air intake, a fuel supply pipe within issuing the fuel through its open top, a movable nozzle forming an auxiliary storage chamber for the fuel, a needle valve within said nozzle having a tapered inner portion reaching into the supply pipe, and a lever operatively connected with the nozzle adapted to move said nozzle and needle valve up and down on the fuel supply pipe whereby both the air and fuel supply may be regulated and stopped by the operator.

3. A carbureter for producing explosive mixtures of constant proportion comprising a mixing chamber with tapered air intake, a stationary fuel pipe within, a nozzle forming an auxiliary storage chamber for the fuel sliding on the fuel pipe and communicating therewith, said nozzle being tapered complementary to the tapered air intake and having discharge orifices in the tapered portion so that both may be closed when the nozzle descends, and a needle valve reaching into the fuel pipe for regulating the flow of fuel into the nozzle storage chamber connected to said nozzle and moving in unison therewith.

4. A carbureter for producing explosive mixtures of constant but variable proportions comprising a mixing chamber with air intake, a fuel pipe within, a nozzle forming an auxiliary storage chamber for the fuel sliding on the fuel pipe while in communication therewith and throttling the air intake, a needle valve for controlling the continuous fuel supply to the nozzle storage chamber connected to the nozzle and moving in unison therewith and adapted to be so adjusted that various quantities of fuel may be mixed with a certain quantity of air.

5. A carbureter for liquid hydrocarbons comprising a mixing chamber with tapered air intake, a liquid supply tube vertically mounted within the carbureter, a movable nozzle adapted to slide on the liquid supply tube forming a storage chamber and having an annular portion tapered complementary to the tapered air intake, and discharge orifices in said tapered portion of the nozzle, so arranged that the air intake and discharge orifices are open when the nozzle is in a raised position and both are closed when same is lowered.

6. In a carbureter for liquid hydrocarbons, a liquid supply pipe with enlarged conical portion formed on its top, a downwardly extending tube formed on said conical portion, a movable spray nozzle with inner tube rising from its bottom extending into the downward tube of the supply pipe and sliding thereon, a tubular top portion on said nozzle with opening flanged out and tapered below to render it adapted for receiving the conical portion of the supply pipe whereby a closure for the liquid supply is formed.

7. A carbureter for liquid hydrocarbons, a liquid supply pipe with bored out top portion and enlarged conical portion formed on its top, a downwardly extending tube formed on said cone, an adjustable needle valve reaching into said bored out portion, a movable spray nozzle with inner tube rising from its bottom extending into the downward tube of the supply pipe and sliding thereon, a tubular top portion on said nozzle with opening flanged out and tapered below to render it adapted for receiving said conical portion of the supply pipe whereby a closure for the liquid is formed when the needle valve is in too high a position to close the supply pipe.

8. In a carbureter having a tapered air intake and a stationary fuel pipe within, a movable nozzle forming an auxiliary storage chamber for the fuel and having centrally an annular tapered portion with discharge orifices therein, said nozzle being adapted to be moved up and down on the fuel pipe while in communication with the top opening of same.

9. In a carbureter for producing explosive mixtures of constant proportions, a stationary fuel supply pipe within, a nozzle, an in-

ner tube integral therewith extending from the bottom upward and surrounding the supply pipe and movable thereon forming thus an auxiliary storage chamber and having annular discharge orifices.

10. In a carbureter for producing mixtures of constant proportions, a stationary fuel supply pipe within, a nozzle, an inner tube formed on said nozzle extending from the bottom upward surrounding the fuel pipe and movable thereon, said nozzle having annular discharge orifices and above an extension reaching beyond the carbureter, and an outside lever operatively connected to the top portion of the nozzle whereby same is moved up and down.

11. In a carbureter for producing explosive mixtures of constant proportions, a fuel supply pipe with open top, a nozzle adapted to be moved up and down on the fuel pipe, and a fuel supply regulating and stopping device adjustably mounted within the nozzle and having a tapered bottom portion reaching into the supply pipe so arranged that by moving the nozzle up and down the fuel supply may be regulated and stopped.

12. In a carbureter for producing explosive mixtures of constant proportions, a vertical stationary fuel supply pipe, a nozzle movable thereon forming an auxiliary storage chamber and extending beyond the carbureter, and a needle valve mounted adjustably within the top portion of the nozzle and having a tapered bottom portion reaching into the fuel pipe adapted to regulate and stop the flow of fuel and when differently adjusted to admit of a different but constant quantity of fuel to the auxiliary storage chamber.

13. A carbureter for producing explosive mixtures of constant proportions comprising a mixing chamber with a tapered air intake, a fuel supply pipe within same issuing the fuel through its open top, a movable nozzle forming an auxiliary storage chamber for the fuel, an adjustable, fuel supply regulator tapered proportionately to the air-intake opening and reaching into the supply pipe, a fuel supply stopping device within said nozzle, and means outside of the mixing chamber to move said nozzle and fuel supply regulating and stopping device up and down on the fuel supply pipe whereby both the air and fuel supply may be regulated and stopped by the operator.

14. In a carbureter for producing explosive mixtures of constant and variable proportion comprising a mixing chamber with a tapered air intake, a fuel pipe within, a nozzle forming an auxiliary storage chamber for the fuel sliding on the fuel pipe while in communication therewith and throttling the air intake, a needle valve for controlling the continuous flow of fuel to the storage chamber of the nozzle having a lower portion tapered proportionately to the air-intake opening and reaching into the upper portion of the supply pipe, said nozzle and needle valve moving in unison and being adapted to be adjusted so that various quantities of fuel may be mixed with a certain quantity of air for producing different grades of explosive mixture.

15. In a carbureter, a sliding nozzle having an outside tapered portion forming a liquid storage chamber, a liquid inlet to the storage chamber and a hub rising from the bottom around the inlet, discharge orifices from the storage chamber, and an adjustable needle valve with a lower cone-shaped portion tapered proportionately to the air-intake opening and reaching into the supply pipe connected inside the chamber and having a stem for operating the nozzle.

16. A carbureter for producing explosive mixtures of constant proportions comprising a mixing chamber with tapered air intake, a fuel supply pipe within issuing the fuel through its open top, a movable nozzle forming an auxiliary storage chamber for the fuel, a needle valve adapted to close the liquid supply to the storage chamber within said nozzle having a lower portion tapered proportionately to the air-intake opening and reaching into the top of the supply pipe for regulating the continuous flow to the storage chamber, and a lever operatively connected with the nozzle adapted to move said nozzle and fuel regulator and fuel supply stopping device up and down on the fuel supply pipe whereby the air and fuel supply may be regulated proportionately, and the air and liquid inlets may be closed.

Signed at New York, N. Y., this 20th day of April, 1909.

CHARLES A. MARRDER.

Witnesses:
LUDWIG K. BÖHM,
FLORA GREENWALD.